FIG.1A

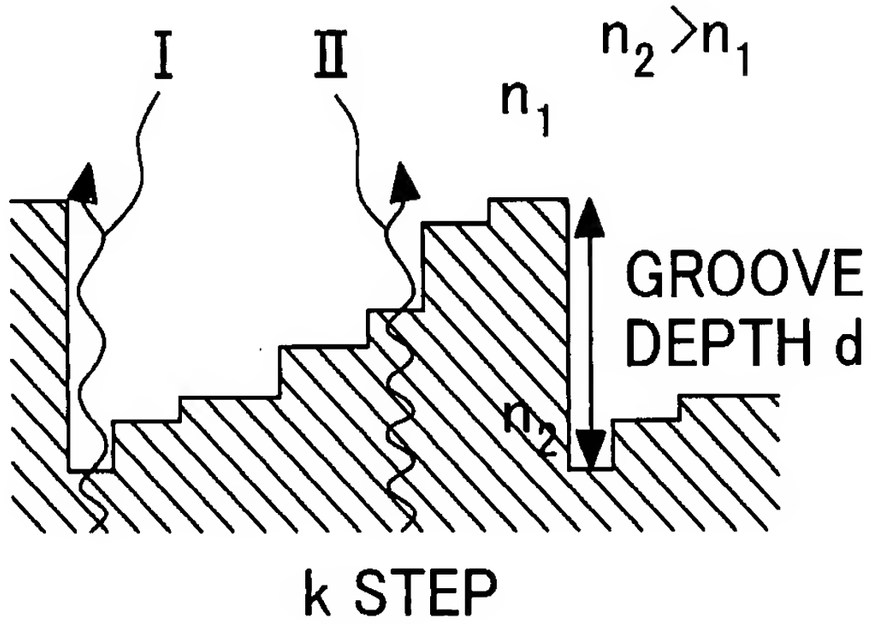


FIG.1B

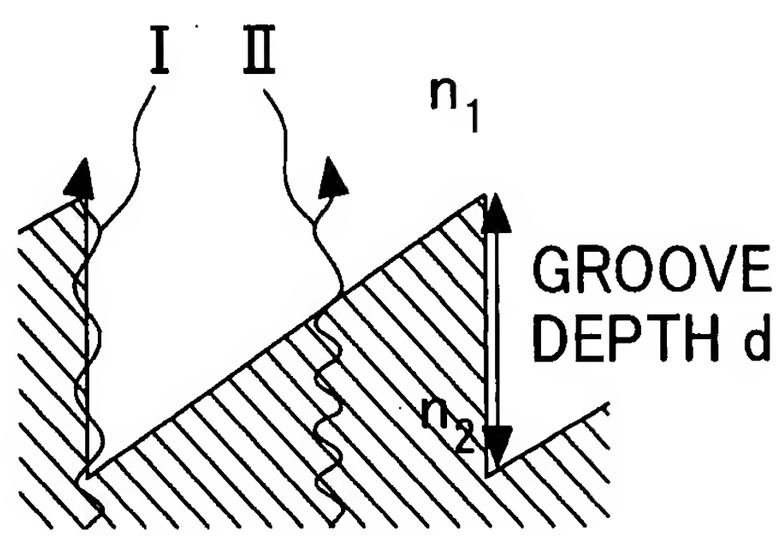


FIG.1C

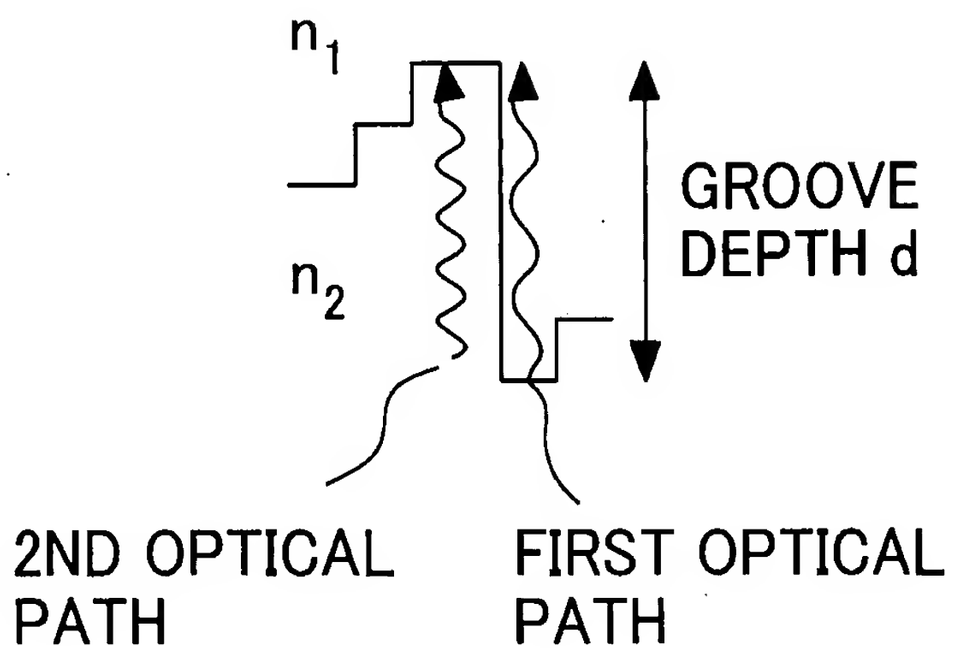


FIG.1D

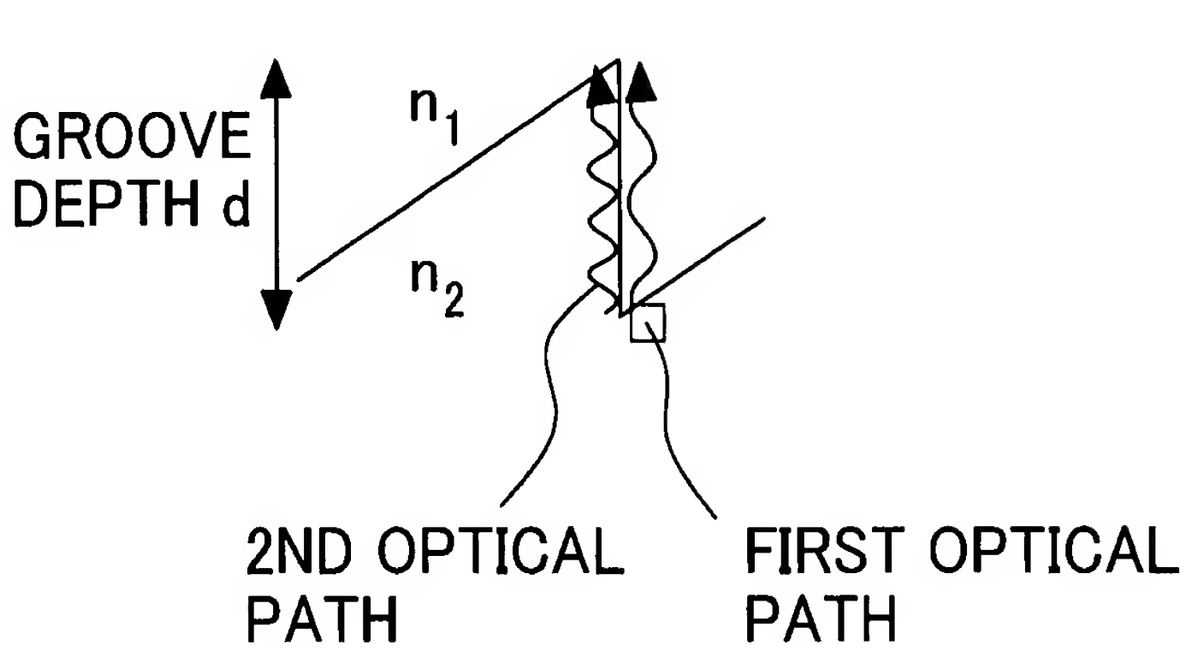


FIG.2

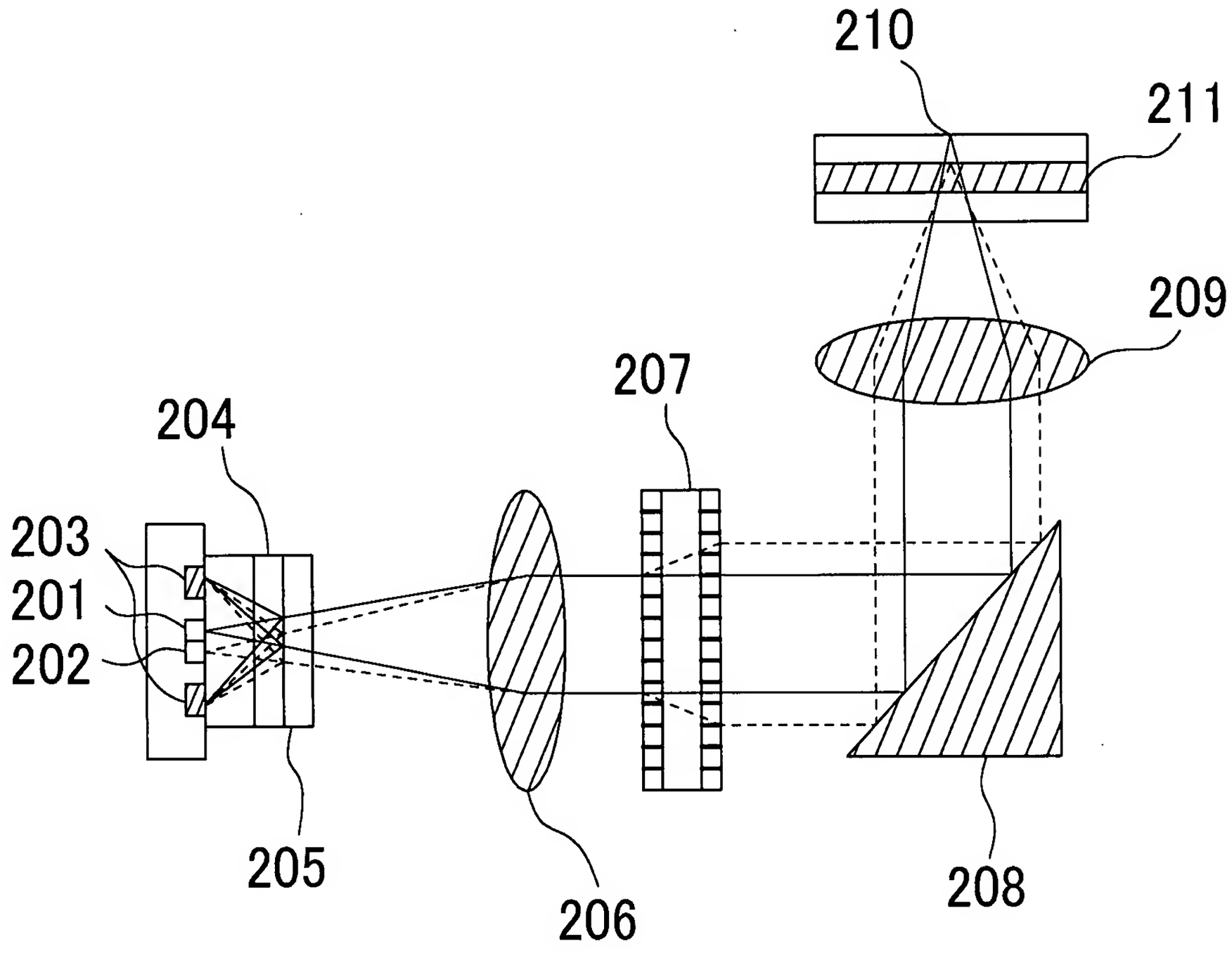


FIG.3A

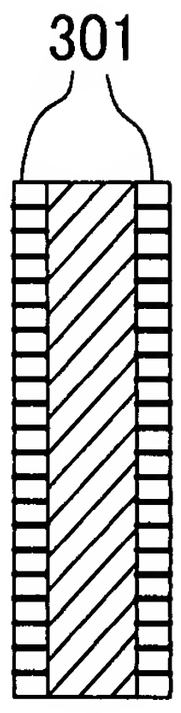


FIG.3B

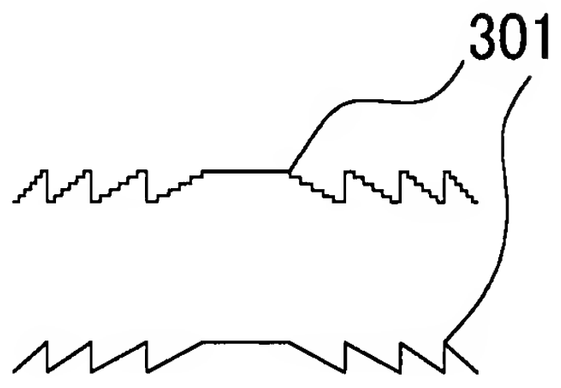


FIG.3C

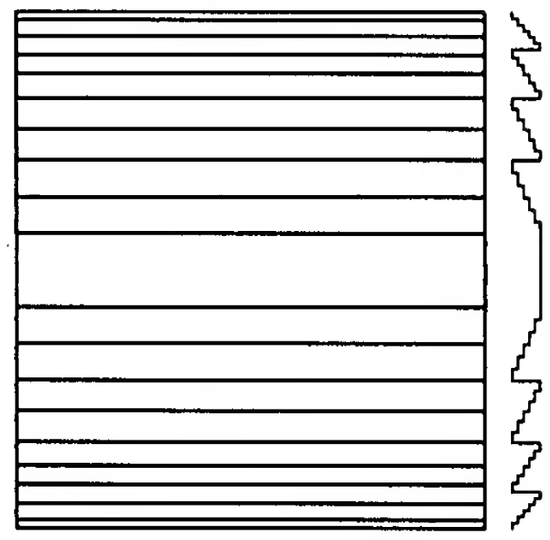


FIG.3D

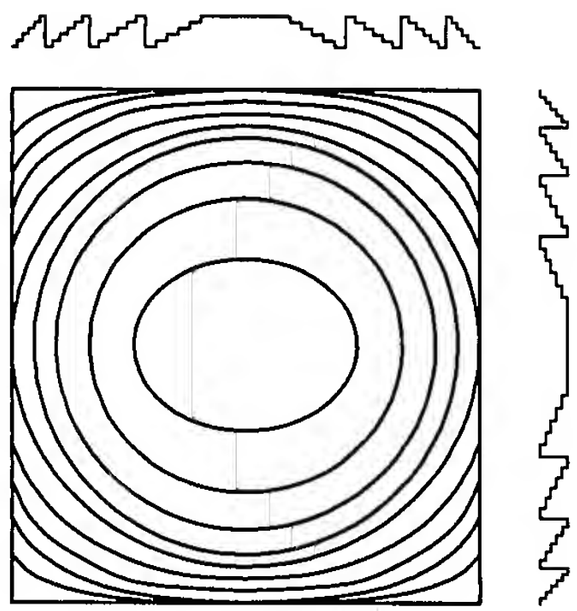


FIG.3E

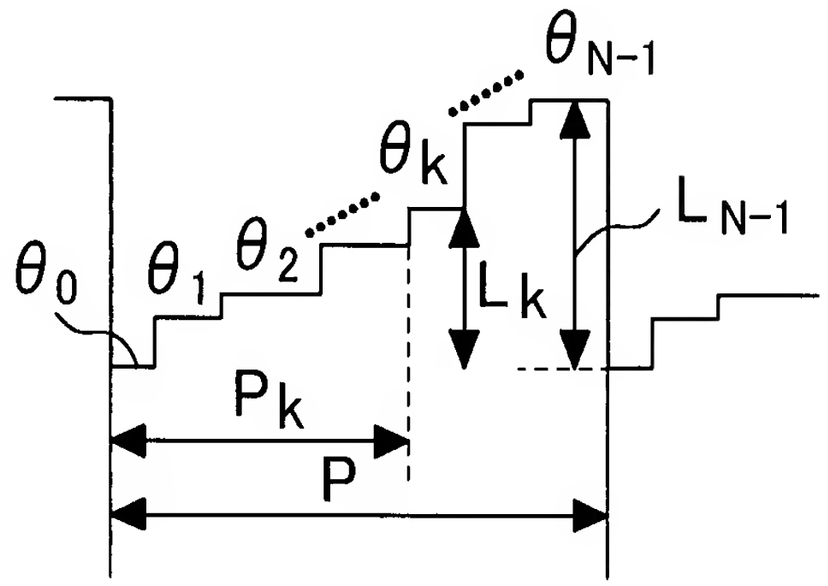


FIG.4

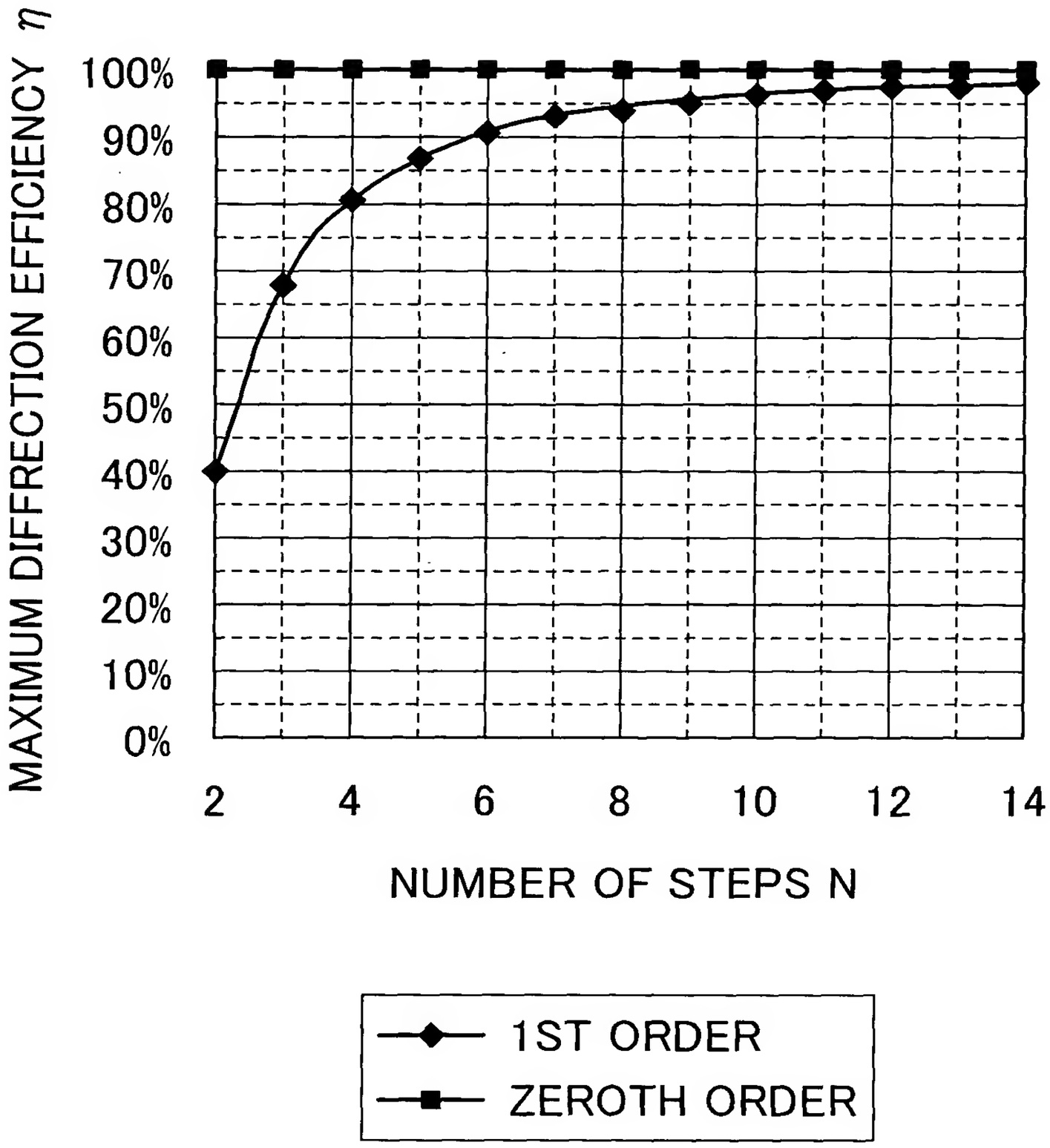
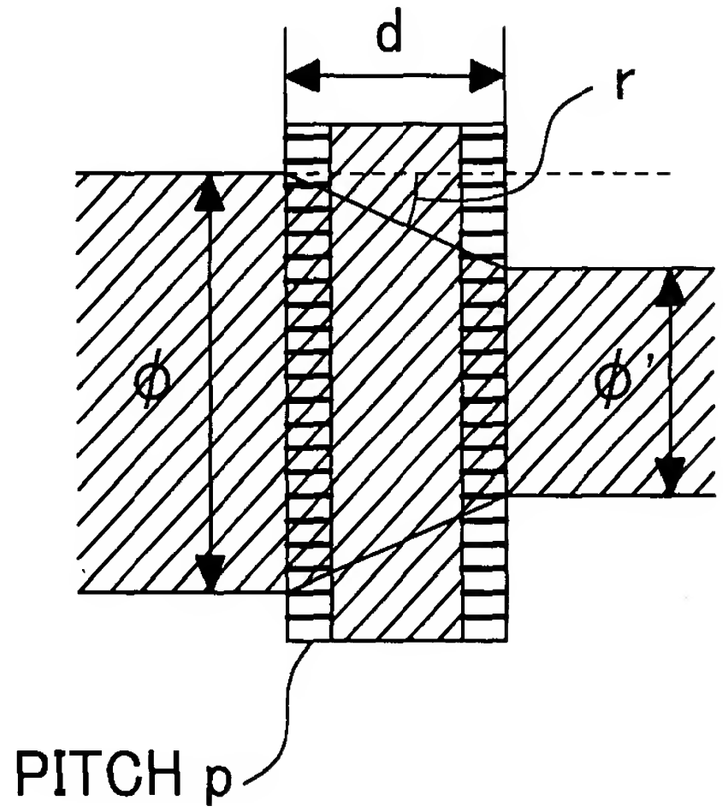

MAXIMUM DIFFRECTION EFFICIENCY η
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2
4
6
8
10
12
14
NUMBER OF STEPS N
1ST ORDER
ZEROTH ORDER

FIG.5



$\Delta\phi \equiv \phi - \phi'$

FIG.6

NUMBER OF STEPS N	EFFICIENCY [%]		GROOVE DEPTH (EACH STEP) Lk[μm]									
	CD	DVD										
5	99.9	76.6	6.336	4.752	3.168	1.584	0					
6	95.1	80.0	7.786	6.238	4.678	3.122	1.570	0				
7	95.6	82.1	6.367	6.273	4.726	3.184	1.639	1.543	0			
8	95.4	85.6	7.823	6.296	6.209	4.677	3.151	3.061	1.532	0		
9	95.1	87.7	7.832	6.318	6.236	4.719	4.637	3.117	1.601	1.520	0	
10	96.1	90.1	7.840	6.333	6.260	4.749	4.678	3.168	3.095	1.586	1.512	0

FIG.7A

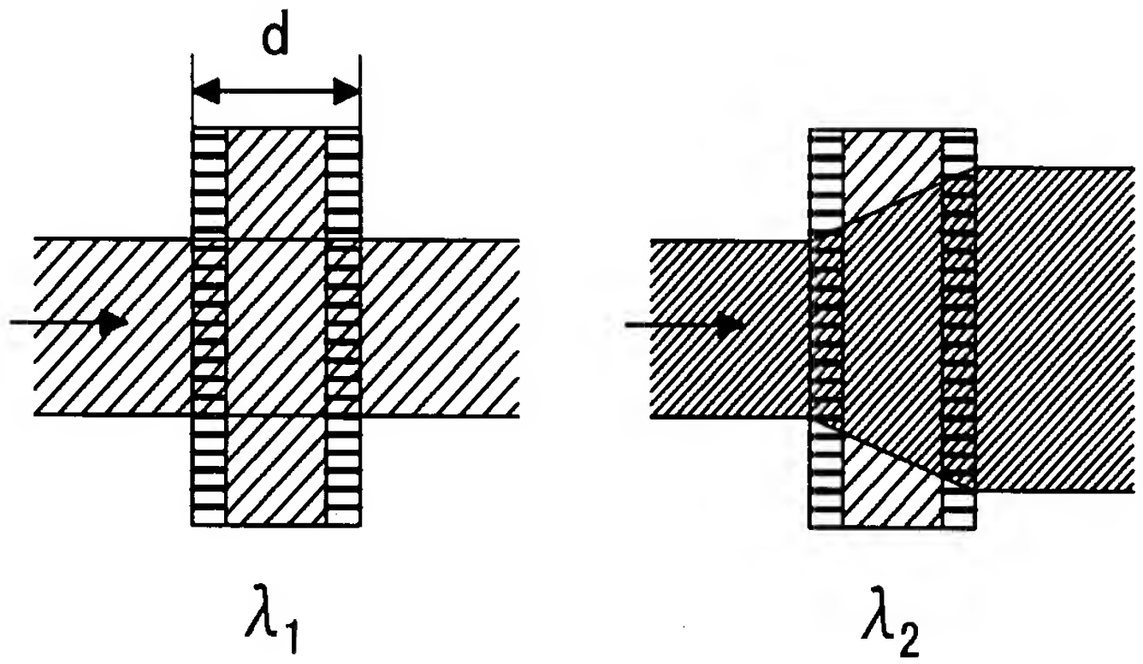


FIG.7B

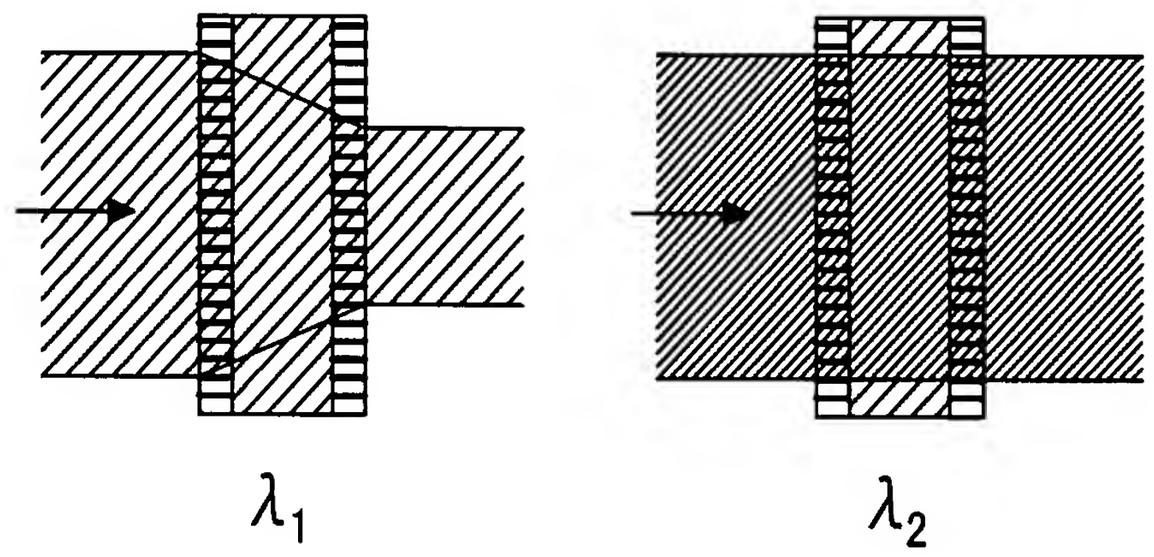


FIG.7C

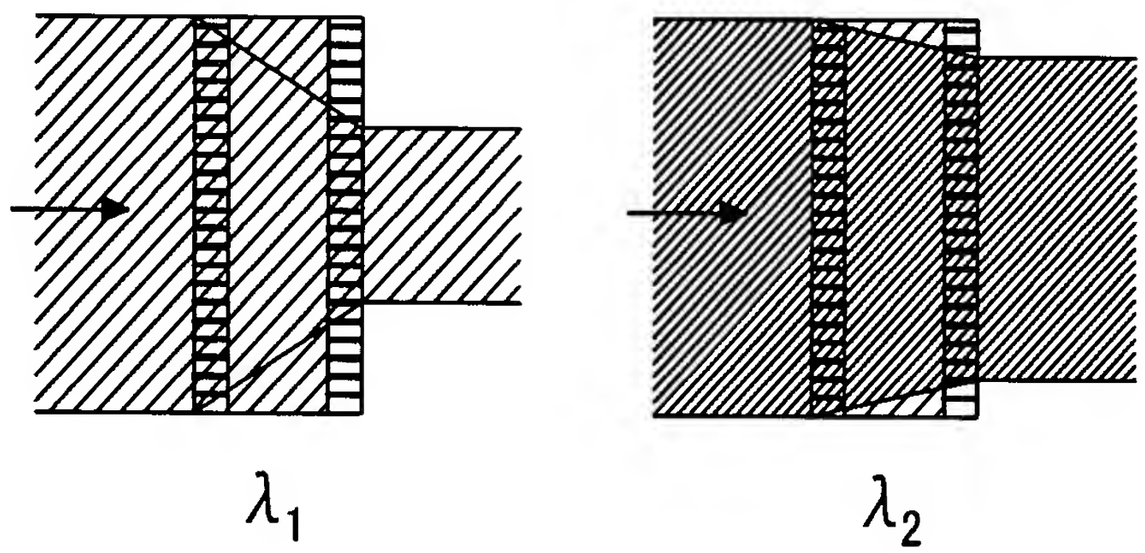


FIG.7D

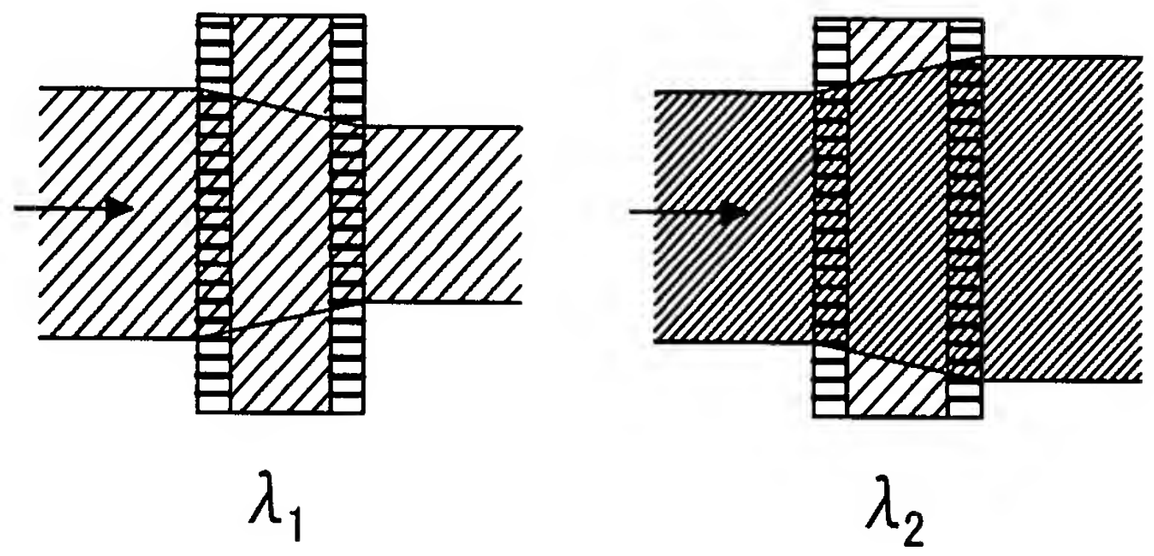


FIG.8

NUMBER OF STEPS N	EFFICIENCY [%]		GROOVE DEPTH (EACH STEP) Lk[μ m]								
	CD	DVD									
8	90.2	77.4	6.518	5.135	5.333	3.950	2.568	1.185	1.383	0	
8	90.2	78.0	6.518	6.715	5.333	3.950	2.568	2.765	1.383	0	

FIG.9

NUMBER OF STEPS N	EFFICIENCY [%]		GROOVE DEPTH (EACH STEP) Lk[μ m]
	CD	DVD	
SAWTOOTH -SHAPED	100.0	77.2	MAXIMUM GROOVE DEPTH 1.58 μ m

FIG.10

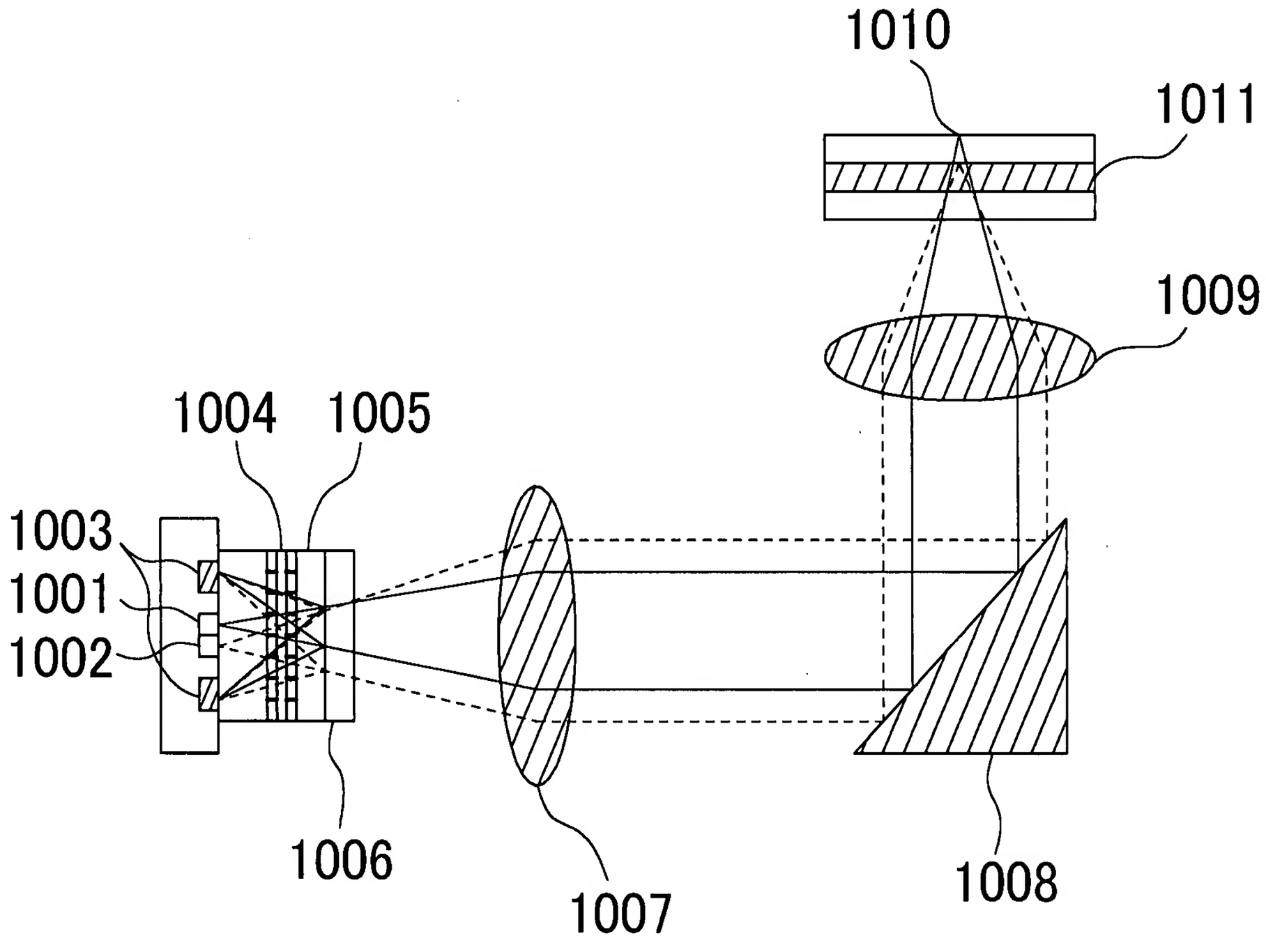


FIG.11

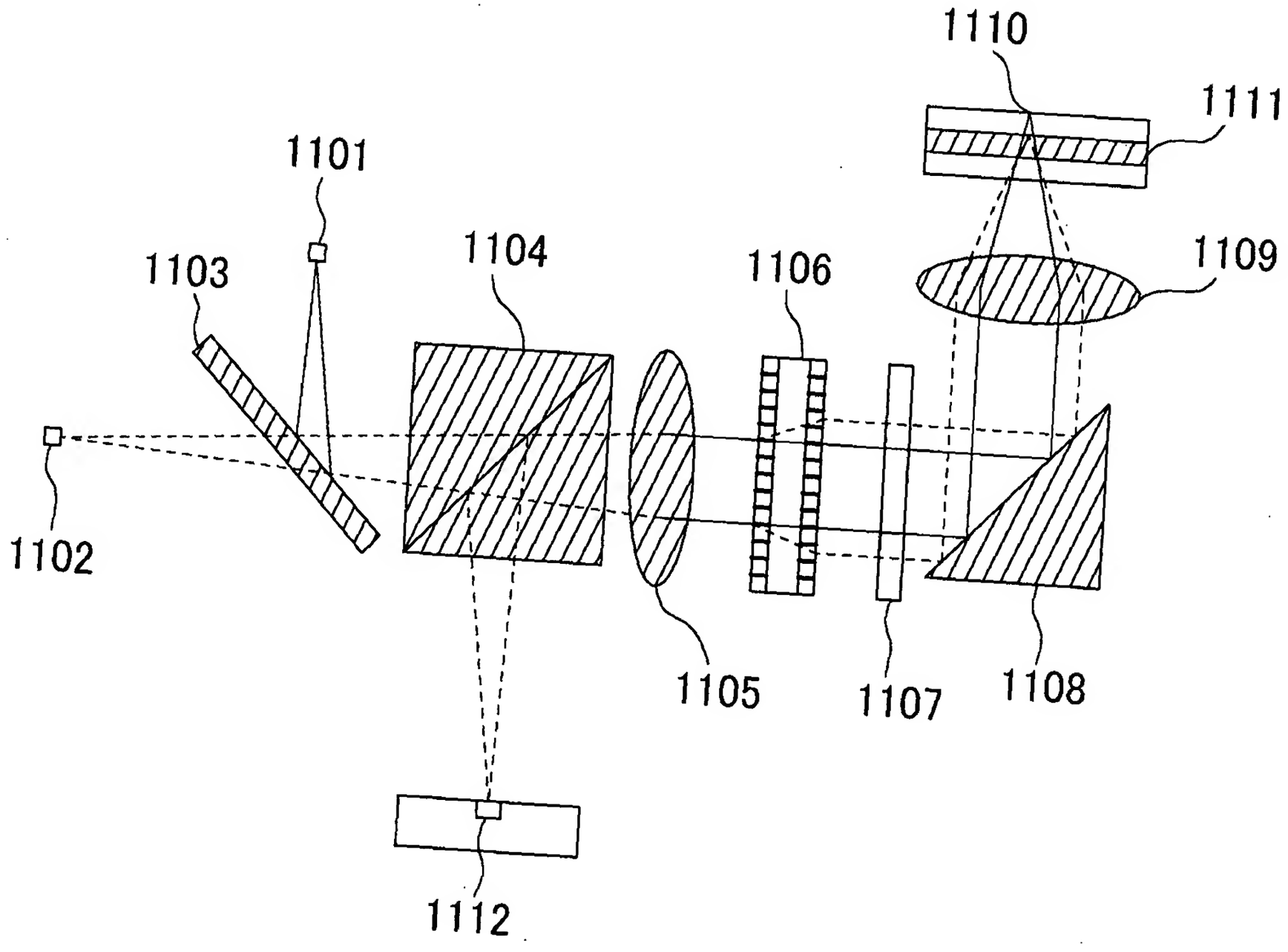
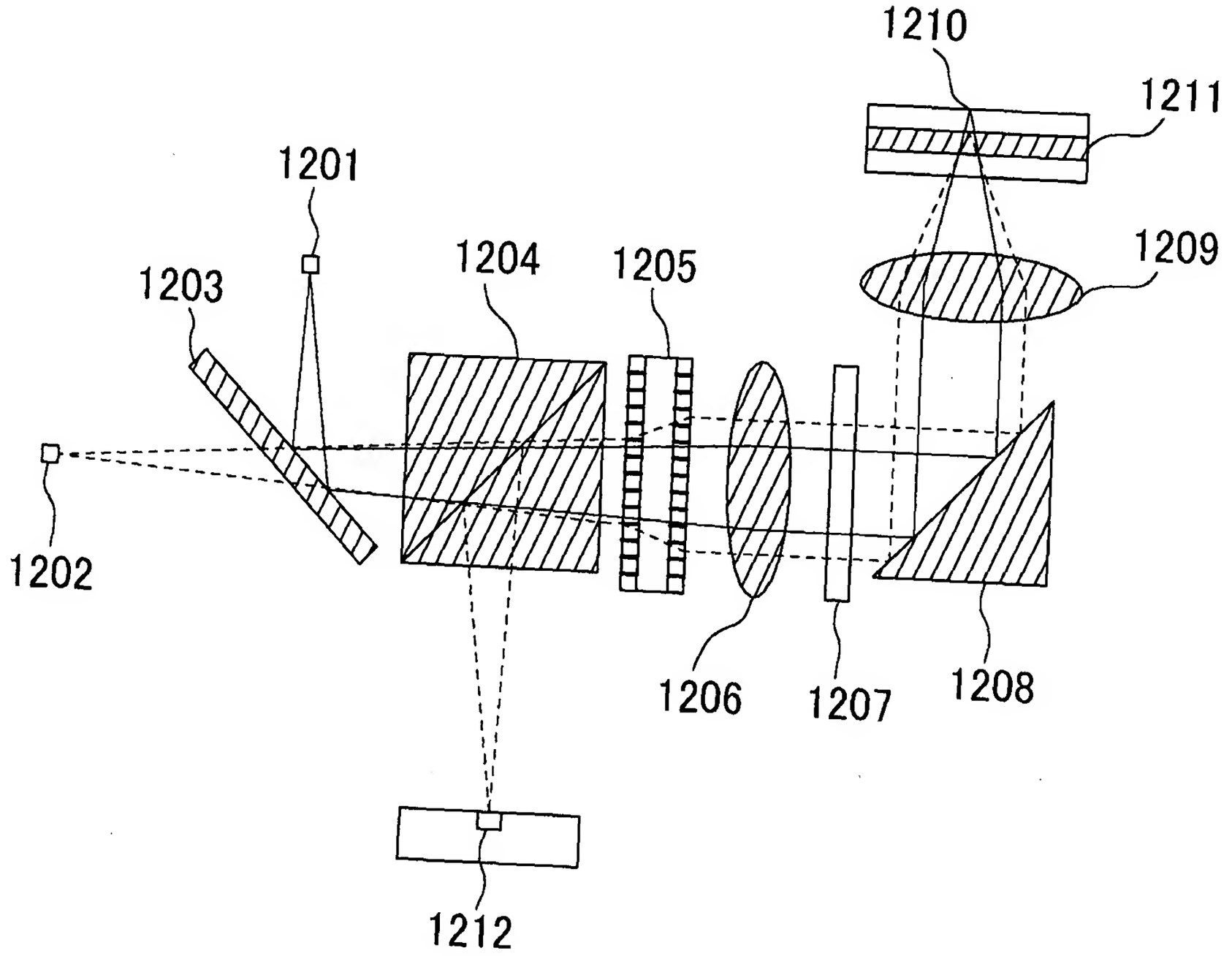



FIG.12